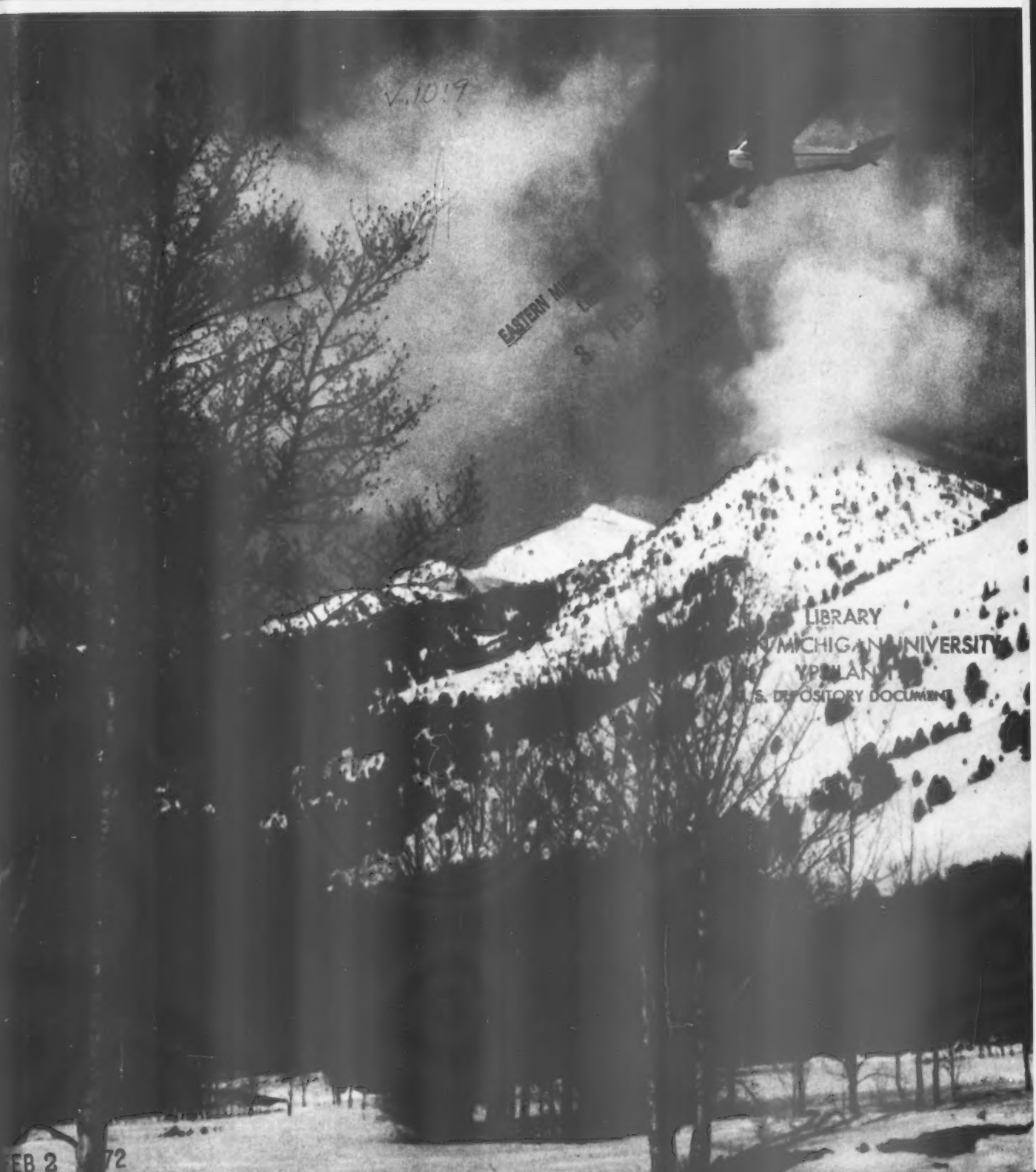
FAA AVIATION NEWS

FEBRUARY 1972



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COVER:
Ski country airstrips are short and sweet—and sometimes full of surprises. Page 3.

FAA AVIATION NEWS

DEPARTMENT OF TRANSPORTATION/FEDERAL AVIATION ADMINISTRATION VOL. 10, NO. 9

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How to fight the white stuff. Page 8

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Skier/pilots who take their own planes to winter sports areas always are happy to hear about airstrips located close to the resort. Nothing beats climbing out of the plane, putting on your skis and heading straight for the lifts. But a word of caution: very few ski resorts possess anything like a long, level stretch of land. Skiing is done on mountains, and any adjacent airstrip is likely to have a pronounced, if not easily apparent, slope. If you have never landed an aircraft on a sloping runway you may be in for a few surprises.

Surprise Number 1. Most mountain pilots consider the slope grade more important than the wind sock. If you land uphill, gravity will stop you sooner or later, even if a gale is blowing on your tail and the runway is iced. If you land downhill, you may need a drag-chute to keep you from dropping into a canyon, regardless of the headwind and the brakes.

If the wind conditions at a sloping airport are really nasty, the experienced mountain pilot will simply avoid operating on the runway until conditions improve. But if he has to use the strip, he will respect gravity more than wind. Even if the runway is paved and apparently swept clean of snow —which is not often the case in recently established mountain resort airstrips—you cannot depend upon it for normal traction. A thin coating of frost is enough to negate all braking, and if the slope is downhill, you may easily run out of runway long before you have slowed sufficiently to turn without ground looping.

If your plane wears skis, landing uphill is even more important. You will have very little directional control on packed snow or ice, and the longer your landing run the more likely you are to get into trouble. Landing on an upgrade will bring the plane to a halt in a remarkably short time, which explains why Alpine pilots are able to land on the slender brow of a glacier.

Never take off uphill without careful consideration of the combined effects of slope, wind, rate of climb, obstructions and the possibility of downdrafts encountered downwind of hills or tree lines. Even on a broad plateau, the effects of gravity will lengthen your takeoff run interminably and you may not be able to clear the nearest land obstacle. Ski resorts are usually nestled among mountains, and you want to be comfortably airborne before you have to maneuver your way around the slopes. If you have an engine failure shortly after taking off uphill, you may not have enough airspace to establish any kind of a glide.

Taking off downhill you will find that the force of gravity more than compensates for the ordinary tailwind. Moreover, you will be able to rise above the terrain with a much more shallow angle of climb than would be required on a level or uphill runway.

Surprise Number 2. The only disadvantage of a downhill-downwind takeoff, which must be borne in mind, is that you are not likely to abort the takeoff without bending some metal. Like starting down a ski jump run, you are quickly committed to a flight of some kind, but at least it will be downhill going all the way.

Some pilots assume that in winter they will have all the power they need to climb out of any mountain airport they can fly into, thanks to the lowered density altitude at this time of year. It is true that a mile-high resort may have the relative density altitude of sea level at standard conditions or even lower in subzero weather, but the climbout could still be a problem if the aircraft is heavily loaded with skis, ski boots and other winter gear, *and if the pilot tries to take off uphill.*

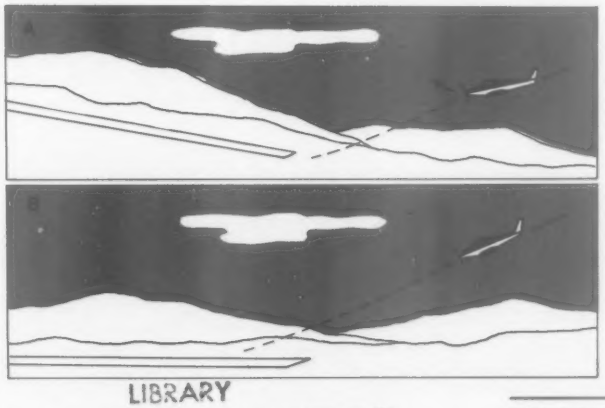
Determining the grade of a small airstrip from the air is just about impossible when the site is surrounded by mountains on all sides. What appears to be a perfectly level valley floor may have a grade of two or three percent—roughly half to the normal glide angle of a small aircraft approaching to land. Flowing water is one clue to direction of slope, but this may not be discernible in winter.

Pilot/skiers flying to an unfamiliar resort airport can prepare themselves in advance by checking the "Remarks" entries in the Airport Directory of the Airman's Information Manual (Part 2), and by contacting the airport operations office. That is the only way to make certain you do not arrive at an untimely hour when the UNICOM is unattended, the weather marginal, and the light is fading over a box canyon runway that appears to slope sharply in both directions (which can be true).

Landing uphill is pretty much like landing on the flat except that you will need more rotation than usual during roundout. The higher pitch attitude causes rapid loss of air speed and reduced "floating". To compensate it is recommended to carry extra power on final to reduce the rate of air speed loss.

Otherwise, especially when you have no horizontal point of reference, you could find yourself, on your first attempt to land uphill, coming in lower and slower than you realize and possibly landing short. There is an optical illusion involved that only experience can dispel, and it is not at all a bad idea to try landing uphill a few times alone in the airplane before you ferry a group of skiing friends to snow country.

Better still, try it with an instructor pilot. After all, even our Olympic skiers need a little coaching now and then. L.D.G.



A sloping runway requires a steeper, faster approach. If you maintain the same glide angle with respect to the runway for an upgrade (A) as you do for a level strip (B) you may bump your nose on the threshold. The grades of mountain airstrips are impossible to estimate from the air.

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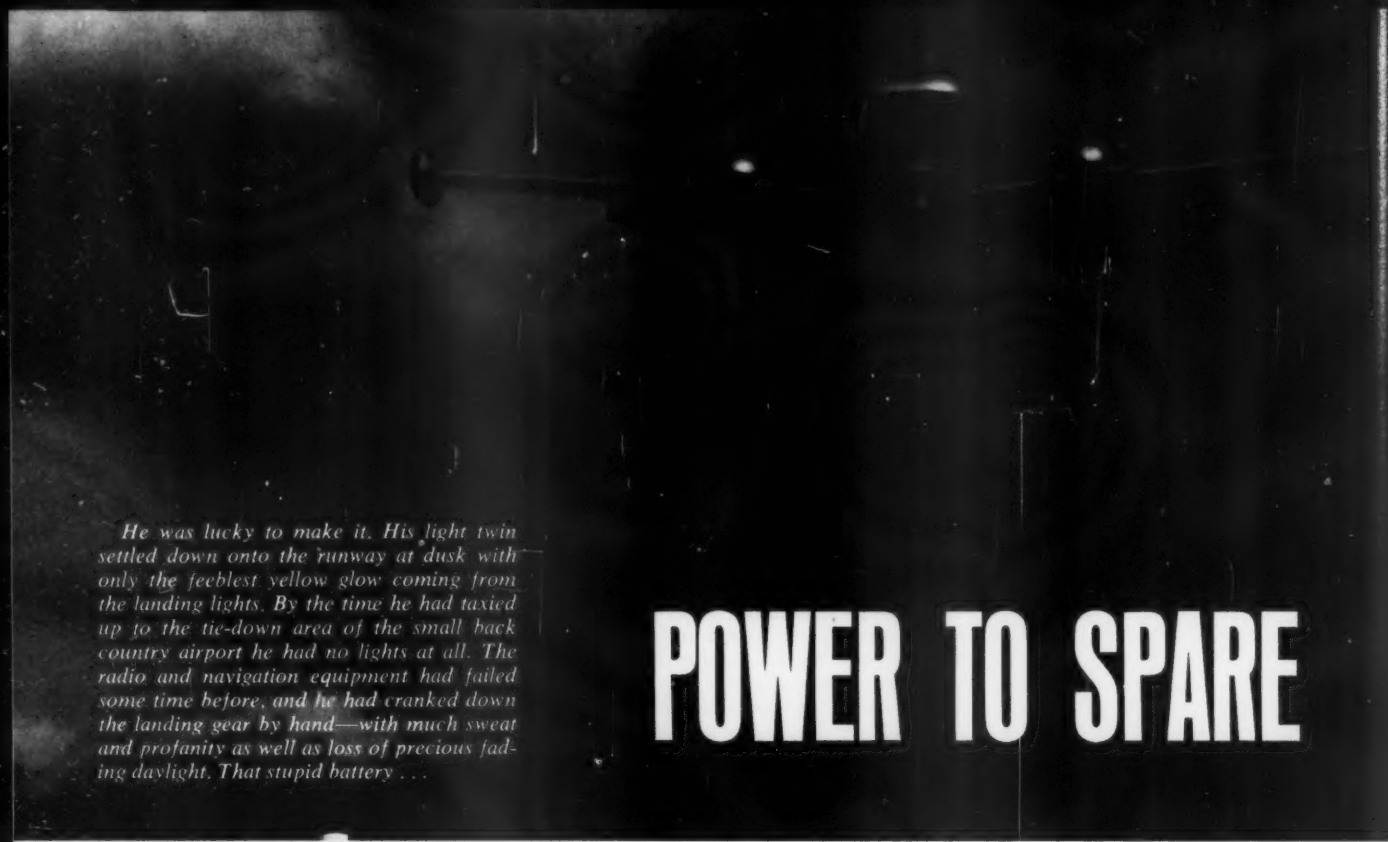


He was lucky to make it. His light twin settled down onto the runway at dusk with only the feeblest yellow glow coming from the landing lights. By the time he had taxied up to the tie-down area of the small back country airport he had no lights at all. The radio and navigation equipment had failed some time before, and he had cranked down the landing gear by hand—with much sweat and profanity as well as loss of precious fading daylight. That stupid battery . . .

POWER TO SPARE

Actually the fault lay not in the battery but in the generator, and if any stupidity was involved, it would have to be traced directly to the pilot, who failed to realize in time that his particular rented twin had *one*—not two—generators. Most twins have a separate generator or alternator for each engine, and loss of both of them in flight is rare. Naturally it is not a good idea to continue any flight into darkness or IFR weather without a backup.

So much electrical power is required in the modern airplane that if a normal output is not being supplied from the generating source, a critical power shortage can develop within an hour or less. Engine ignition is still an independent system, as it was in the earliest days of flight, depending on the magnetos for energizing the spark plugs, but the list of equipment that operates directly from the aircraft electrical system is as long as your arm.

This may include, in addition to lights, such items as radios, landing gear, transponders, starter motor, navigational and engine instruments, de-icing gear, cabin heat, flaps, autopilot, fuel pump, heated pitot, etc. Our acknowledged dependency on electrical equipment makes it the business of every pilot to understand what may go wrong in the electrical system in flight, and what he may do about it to ensure a safe landing.

Most single engine aircraft use an ordinary 12-volt lead/acid wet cell battery, similar to the one used in automobiles. Twins usually use a 24-volt battery, or a hook-up of two 12-volt units. These batteries need no special care, other than periodic checks for water levels and possible leakage. The state of charge is measured either with a squeeze-bulb hydrometer, which tests the density of the electrolyte, or by a voltage meter under load.

In normal flight, the battery is used only to start the engine, which then takes over the task of supplying all necessary electricity; the battery "floats" at full charge as a standby source of emergency power. The current required is drawn from the generator, or alternator, which is controlled by the voltage regulator. If the latter breaks down, or "sticks," insufficient power may be generated, at which point current will start to flow from the battery. A short in the electrical system could also result in power being drawn from the battery, by creating an excessive demand upon the generator.

Limits of Battery Output

As a source of standby power the battery will have a limited lifespan, depending upon the load placed upon it and battery capacity. For example, a 30 amp battery at full charge will put out approximately 30 amps for one hour; or 15 amps for two hours, 10 amps for three hours, etc.

As in automobiles, aircraft engines are now being provided with alternators in place of generators. Both supply alternating current, which is converted to direct current, but the alternator is lighter and capable of putting out more power at lower rpm speed (most generators require at least 1,000 rpm in order to function).

An alternator may not be capable of charging a very low battery. In such circumstances, once the engine has been started always check the ammeter to see whether the battery is accepting the charge.

Most battery-equipped aircraft have an ammeter on the instrument panel. The information provided by this instrument is not always correctly interpreted. The instrument may be wired in several ways. One type common to the older or smaller aircraft simply shows the rate at which the battery is being charged or discharged. When electrical power is being supplied *by the battery*, the ammeter needle is deflected to the left. When the needle moves to the right of center, it shows the rate at which the battery is being charged by the generator (or alternator).

Under normal circumstances this type of ammeter will show a slight discharge (−) when the master switch is turned on, a strong discharge when battery power is cranking the engine, and a strong charge (+) while the engine is revving up. Inflight the needle will be centered or slightly on charge. Continued readings of heavy charge or discharge spell trouble: there may be a short in some electrical unit, or a malfunction of the battery, regulator or generator.

Modern and more sophisticated aircraft may employ an ammeter which is wired to show the power load produced by the generator. The instrument will read from zero to maximum output. It will also show a strong charge immediately after startup, and

thereafter a charge equivalent to the electrical power needs of the aircraft. If the pilot knows the normal inflight draw is 15 amps, and he observes a continued reading distinctly higher (or an unwarranted fluctuation), he must suspect a malfunction in the system.

Some aircraft simply use a warning light which flashes on to show when the generator is not operating or is malfunctioning. None of the panel instruments indicate the *absolute stage of charge of the battery*—this cannot be determined inflight, except as indicated by failing power when the generator has cut out.

The pilot who receives a warning of electrical trouble inflight should isolate the problem, if it is not in the power supply system itself, by turning off all electrically supplied elements and individually turning them back on, observing any effect upon the ammeter. A sharp jump in the charging rate may indicate a short circuit; no change means an open circuit (non-functioning element). If the warning light goes out and remains out, or if the load demand is reduced to normal, he may assume he has isolated the problem, but he should have his electrical system checked by a mechanic at the first opportunity.

If trouble persists, he should immediately inform the nearest FSS, control tower or center of his position, his problem, and his plans for landing.

After completing the communication he may wish to shut off his radio and other elements in the electrical system to conserve power until he is actually approaching his intended touchdown point. It may be to his advantage to select a controlled airport, since the control tower could be advised by air traffic service of his predicament and could assist him by clearing other traffic away from the runway as he approached.

Obviously the better the condition of the battery, the greater standby power it will provide. The majority of aircraft batteries, unfortunately, are not conveniently located from the point of view of frequent checking and servicing, and neglect sometimes leads to breakdowns. Over the past several decades, research has led to the development of *nickel cadmium* batteries which produce almost twice the power output per pound of weight, and which hold their charge during long periods of disuse.

Opposing Chemicals

In contrast to the conventional lead/acid batteries, Ni-Cads use a chemically opposite electrolyte, a strong alkali (potassium hydroxide). These two kinds of batteries should never be combined as a power source, or even stored in proximity. Pilots are cautioned that the slightest traces of acid, even the fumes from lead/acid batteries, can damage Ni-Cads. The charge of Ni-Cads cannot be measured by testing the specific gravity, and under no circumstances should a lead/acid battery hydrometer be inserted in a Ni-Cad.

Thus far, nickel cadmium batteries have found their greatest acceptance in jet aircraft, which require a much higher rpm for startup than piston aircraft. This need is balanced against the high initial cost of Ni-Cads, and their sensitivity to over-charging and thermal runaway (destruction of the battery from uncontrolled increases in temperature and charging rate). Ni-Cads must be removed from the airplane for servicing or testing.

Winter is the adversary of all batteries: more illumination is required, and more energy is used for starting up in cold weather. Consequently this is the season when the greatest care should be exercised in making certain that your battery is not abused by neglecting to turn off the master switch after shutdown, or by successive starts in quick succession. If the engine conks out shortly after startup, wait a while before restarting. This prevents overheating and overcharging the battery.

The battery/generator system functions automatically under normal circumstances, but pilot surveillance can never be dispensed with. If you do your part, you can be reasonably certain that it will never let you down in the dark.

(Advisory Circular AC 00-33, free from FAA, gives additional details on "Nickel-Cadmium Battery Operational, Maintenance, and Overhaul Practices." Order from DOT Distribution Unit, TAD 484.3 Washington, D.C. 20591.)

Modern Aircraft Electrical System Draws Many Amps

Extra convenience in the form of new equipment often means added drain on the battery, backup power source for electronics, lights, instruments, landing gear, etc. in case of alternator or generator failure. When used as the sole source of power for airplane accessories, even a fully charged battery may last less than an hour. Ni-cad batteries are now being used in jets—above. Left—the engine ignition is a separate system, dependent on the magnetos.

Between the city and the deep blue sea, Los Angeles International is typical of the modern airports whose growth has been checked by urbanization.

It seems only a few years ago that a new airport was the pride and joy of a community, offering a social and economic link with the nation and the world. Young and old gathered at the boarding gates on weekends to dream of adventures abroad and to marvel at the sleek, winged wonders that dropped magically out of the sky.

Today that image has been tarnished in some quarters, where the airport is being viewed with hostility by persons newly concerned with their environment. The rapid growth of aircraft, both in numbers and in size, is being associated with irresponsible noise and air pollution. Is aviation really guilty?

The facts are, as FAA Administrator John H. Shaffer has stated recently in describing aviation, that "no other transportation mode is making a greater effort to improve its interface with environment, or is having greater or faster success."

On both the noise and air pollution fronts, rapid progress is being made in aviation which far outstrips anti-pollution efforts in all other industries. The bigger and better aircraft now being produced have cleaner, quieter engines than ever before. The jet engine, the major target of sensitive environmentalists, is being engineered for compatibility with the communities aviation must serve.

Engine emission. Commercial jets have long been identified with the highly visible plumes of black smoke trailing behind them. This phenomenon is on its way out—thanks to improved engine design. The new Boeing 747 and McDonnell Douglas DC-10, and the soon-to-appear Lockheed 1011 have virtually smoke-free exhausts.

The engine most commonly associated with smoke emission at community airports is Pratt and Whitney's JT8D, which powers the Boeing 727 and 737 and the McDonnell Douglas DC-9. The manufacturer has developed a remarkably more efficient combustor which drastically reduces smoke emission. Since February 1970 only these new engines are being delivered for the appropriate aircraft.

That, of course, does not solve the problem of the existing commercial jet fleet. But in a meeting with U.S. airline representatives in January of 1970 the Department of Transportation worked out an agreement whereby the entire civil fleet of intermediate (two and three engine) jets using JT8D's would be retrofitted with cleaner engines. The individual cost is from $5,000 to $10,000 per engine; the total bill may come to $30 million. To date nearly 70 percent of these engines have been replaced.

Improving the combustion processes in these jet engines will reduce the particulates (visible smoke) by 70 percent. There will also be a reduction of the invisible emissions, such as certain hydrocarbons (50 percent) and carbon monoxide (20 percent). Although air pollution from aircraft engines has been estimated to be only in the order of about 1 percent of the total pollution from industrial sources, a sustained drive has been mounted toward discovering the cleanest possible type of power source for aviation.

As yet there are no precise standards limiting aircraft engine emissions. The 1970 amendments to the Clean Air Act have assigned the job of establishing and enforcing such standards to the Environmental Protection Agency, which is expected to issue new regulations sometime in 1972. These may also affect general aviation aircraft.

Engine noise. Without question the engine noise of low-flying aircraft has brought about the "noisiest" community reaction to the local airport. In many areas suburban sprawl has eliminated the traditional land buffer between towns and airports and brought about a much greater exposure of the public to local aircraft operations. In some cases there is an apparent conflict of interest between those who see the airport as the key to local economic growth and those who see it as a threat to the traditional peace and quiet of "country life."

For many years FAA has sought to ward off such conflicts by urging long range planning for airport sites, which would be surrounded by industrial parks rather than bedroom communities. More recently, Congress authorized the agency (under Public Law 90-411) to withhold certification of all subsonic transport category and turbojet aircraft which fail to meet prescribed noise standards. Resultant standards are expected to reduce by about half the objectionable engine noise from new jets—general aviation as well as air carrier.

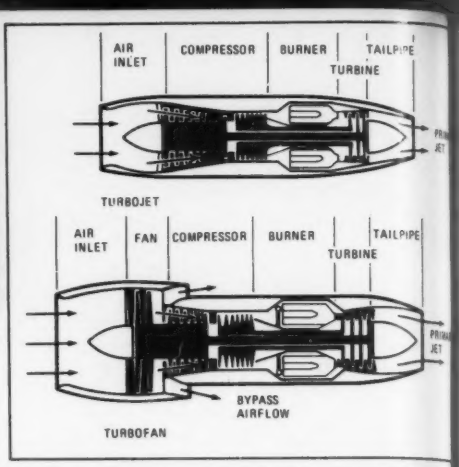


Diagram shows how the addition of a "fan" to the turbojet engine provided an airflow bypass. Compressor fan, however, produces high-pitched whine at approach speeds.

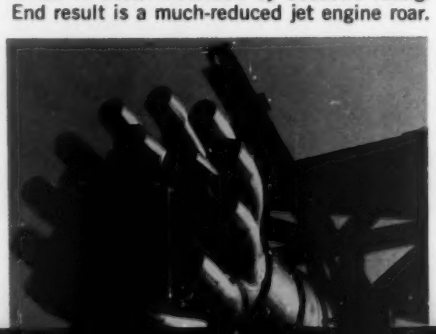
The search for a quieter jet engine has been carried out on a massive scale. One aircraft manufacturer alone has spent more than $50 million over the past five years on researching this problem, and presently employs over 300 engineers involved in basic and applied acoustics.

The familiar "jet roar" of the early turbojets was traced to the turbulent mixing of hot exhaust gases with the atmosphere. Corrective measures consisted of changing the single exhaust nozzle to a cluster of small nozzles—sometimes as many as 48 in a single engine—which appreciably reduced the noise. The introduction of the fan jet engine further reduced the "roar" while increasing thrust. In the turbofan engine, only a portion of the air entering the engine is discharged from the burner can nozzles—the remainder exiting via the fan exhaust nozzle.

However, the fan was found responsible for an annoyingly high-pitched whine, especially noticeable on low approach patterns. Providing the engine with acoustically treated nacelles, usually a fiberglass structural "sandwich," has been found helpful in dealing with this problem. As development of more powerful jet engines continues, each new anti-noise modification has to be checked for unexpected side effects.

In the earliest days of aviation, engineers fought a continuing battle to improve the horsepower/weight ratio of engines, and this battle had to be won before man could fly. Today, when the history of this epic accomplishment has been all but forgotten, it is the thrust/noise ratio that is occupying some of the best brains in industry and government, in a combined effort to restore community goodwill toward the airport it needs and wants. ■

Using many small exhaust nozzles (as in above 19-tube suppressor) instead of one large nozzle changes the sound to a higher pitch, which is better absorbed by acoustic lining. End result is a much-reduced jet engine roar.



FARs

STATUS of the FEDERAL AVIATION REGULATIONS

(As of January 15, 1972)

HAVE YOU BEEN FOLLOWING CHANGES TO THE FEDERAL AVIATION REGULATIONS LATELY? There have been many amendments—perhaps they affect *you* and *your* flying procedures. If you do not own a copy of the FARs, why not look them over the next time you are near your local flight service station or general aviation district office? An informed pilot is a safer pilot.

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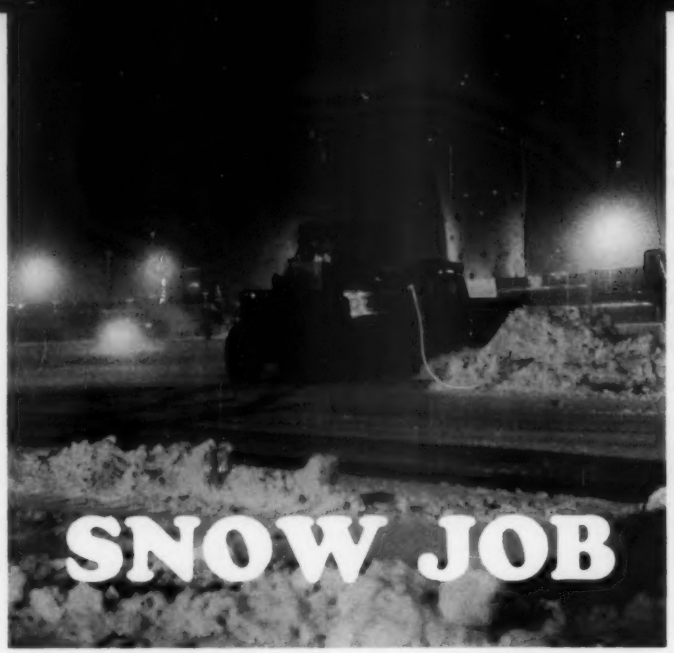
Part 157	Notice of Construction, Alteration, Activation and Deactivation of Airports (3)	
Part 169	Expenditure of Federal Funds for Nonmilitary Airports or Air Navigation Facilities Thereon	
Part 171	Non-Federal Navigation Facilities (7)	

*Changes to individual airspace designations and airways descriptions, individual restricted areas and individual jet route descriptions are not included in the basic Parts 71, 73 and 75, respectively, because of their length and complexity. Such changes are published in the Federal Register and are included on appropriate aeronautical charts.

**Due to the complexity, length, and frequency of issuance, airworthiness directives, enroute IFR altitudes and standard instrument approach procedures are published in the Federal Register and are not included in basic Parts 39, 95 and 97. In addition, enroute IFR altitudes and instrument approach procedures are depicted on aeronautical charts.

Standard instrument approach procedures are published in the Federal Register by reference to FAA documents which are available for examination at the Rules Docket (GC-24) and the National Flight Data Center, in FAA Headquarters, Washington, D. C. and at FAA Regional offices and Flight Inspection District Offices.

SNOW JOB



Snow piled beside r taxiway like mounds after a freeze, Compacted snow and ement

Above—ag planes sometimes come out of winter storage to disperse urea on runways for ice prevention. Right—snow-related delays are expensive, but so is speedy snow removal. A series of high-speed rotary snow-blowers can clear an entire runway in one pass, but each unit may cost $80,000.

Results of a two-year nationwide study of airport snow and ice removal methods, recently published by FAA, have established guidelines for the most efficient winter care of both large and small airports. The final report covers virtually all types of airports operating under varying conditions of climate, air traffic density and economic limitations. Recommendations indicate the most effective equipment, chemicals and application procedures from the point of view of both cost and performance.

In attacking the problem, the investigators first divided airport operating surfaces into three priority areas which determine the sequence in which they are cleared of snow and ice during a storm and afterwards. First priority was given to the main runway, and its associated turnoffs and taxiways, plus sufficient ramp area (usually about 20 percent of the total) to ensure movement of aircraft and surface vehicles.

If a second all-weather runway exists, this is given Priority II. Priority III includes secondary runways, redundant taxiways and turnoffs, and the remainder of the ramp—areas which may be cleared after the storm is over. Four basic runway closure rules were formulated:

1. The entire airport is closed during each Priority I clearance.
2. Priority I area is reopened as soon as it is cleared, thus partially restoring service. Priority II areas, when they exist, are then cleared without interfering with Priority I.
3. In the case of parallel runways, each runway is closed alternately, the airport never being completely closed.
4. Priority III areas are cleared without interfering with either Priority I or II, at the end of the storm.

When to Clear

Another major procedural consideration involved timing—at what point in the storm do you start clearing operations? The report observed that although there seems to be some general agreement that the danger level for slush accumulation is reached at between three-eighths to one-half of an inch, no standard exists. Different airports surveyed used significantly different criteria; and, in a large number of airports, there were no basic rules, but start-up decisions were based entirely on personal judgment.

The report acknowledged some difficulty in formulating quantitative criteria, since snow usually is not evenly distributed on the runway surface. Often, because of aircraft movement, the center of the runway is dry while the outer edges may have accumulated two or more inches of snow. To get around this problem, the report suggested using published weather data on snowfall rather than runway accumulation measurements. With this approach, the report went on, the following standardized procedure would be followed. The center 80 feet of the Priority I runway would be swept whenever three-fourths of an inch of snow falls, and the entire width of the runway would be cleared whenever one and one-half inches of snow has fallen.

Demand on the airport, of course, plays a major role in both the runway closure and clearing start-up decisions. Obviously, a small airport with no nighttime traffic would not conduct regular clearance operations during a storm which continued through the night. Similarly, even a major jetport that restricts flights during certain hours such as National Airport in Washington, would not begin clearance procedures until regular aircraft operations were about to start.

Airport traffic demand, plus cost, are major determining factors in selecting which of several clearance methods are utilized, as well as the types and amount of equipment. Depending on which methods are used, Priority I clearance could take as much as three hours or as little as 15 minutes, according to the report. In the longer method, one or more truck-propelled plows would make successive passes along the length of the runway until the necessary width was cleared. Then snow blowers would remove accumulated windrows of plowed snow. Finally, sweepers would remove whatever snow remained.

In the most rapid method, a tandem of plows sufficient to clear the entire width of the runway in a single pass would move along the runway, feeding snow directly into blowers directly behind them, with a tandem of sweepers bringing up the rear. In this way, a main runway could be cleared in as little as 15 minutes. This rapid method is clearly very costly in terms of investment in equipment, labor and maintenance. It is therefore justified only in the busiest airports where the cost of delays from runway closure are extremely high.

The cost of delays from runway closures varies not only with the number of operations at the airport and the length of the delays, but also with the typical mix of aircraft types. Using average figures from many geographical regions, the report observed that delay costs varied from some $2 a

taxiways or on ramps can turn into concrete-
freeze, presenting a serious hazard to planes.
ement is easier to prevent than to remove.

minute for smaller general aviation aircraft up to as much as $41 a minute for the jumbo jets. Thus two airports that were identical in all other ways except the ratio of commercial to general aviation aircraft would be considering sharply different delay costs in making procedural and equipment decisions.

On the subject of snow removal equipment, the report was able to be quite specific in its recommendations, since it was able to make precise comparisons of different equipment types. Among the three basic plow types, for example, a clear preference was expressed for the so-called reversible plow over the one-way and roll-over plows. It was judged the most versatile because of its ability to move snow to either side or to bulldoze—something the roll-over cannot do and a desired capability in an airport plow—and because its unique trip mechanism would protect against damage to runway lights. With regard to snowplow cutting edges, the report made a variety of recommendations depending upon the existence and design of centerline lighting systems.

The choice of sweeper (a towed type was considered most desirable) was made largely on the basis of cost. A towed sweeper cost only about half the price of a self-propelled one, while a self-propelled sweeper would nevertheless have to be preceded by a plow-equipped vehicle if it is not to be slowed down by deeper accumulations of snow.

The recommended choices for a rotary snow blower in general favored the integral single purpose type over the self-contained attachment type.

The choice between light and heavy vehicle carriers was less clear, the report said, since each type was best suited for different tasks. The speed, economy, conventional design and easy availability of parts make the lighter trucks attractive for many runway clearance operations. But the heavy trucks are needed where deep snow removal is required, such as on ramps, or where large, heavy reversible plows are needed. It appears that a mix of the two types tailored to the specific needs of the airport would probably be the best solution to the problem.

The problem of compacted snow or ice was dealt with separately because it cannot be completely eliminated by mechanical plowing. The adhesive strength of ice to pavements can be as high as 80 to 120 psi (pounds per square inch). And attempts at mechanical removal can result in serious damage to the pavement. Efforts to deal with ice generally fall into three basic categories: surface treatment with abrasives such as sand; the use of fixed or portable heat sources; or application of chemicals as either anti-icers (preventing formation of ice) or de-icers (removing accumulated ice).

The use of abrasives is regarded strictly as a stop-gap emergency measure. Most are only marginally effective and then for only a short time, since they rapidly disappear from the runway surface, either being blown off by wind or engine blast or else sinking below the surface of the ice. Abrasives also present a serious danger when they are ingested into aircraft engines.

Heated Runways Too Costly

The report also rejected thermal approaches for a variety of reasons. Permanent thermal systems imbedded in the pavement, using either hot-water pipes or electrical wires, were viewed as far too costly at this state of technical development. Portable thermal systems such as flame-throwers also were rejected because of slow operating speed, because they cannot be used during precipitation to maintain the runway in operating condition, and because their misuse could lead to serious runway damage.

Alcohol, glycol, and urea are three common, commercially available chemicals that form the base of a variety of patented substances which dissolve ice in some degree or resist its formation. All have some advantages and some disadvantages, but alcohol and glycol were viewed by the investigators as least desirable.

Alcohol was poorly rated because being highly volatile, it presents fire hazards and evaporates fairly quickly. Because of its low specific gravity it tends to remain on top of ice (when used as a de-icer), instead of sinking down to attack the bond with the pavement. Alcohol is sometimes mixed with glycol, which is less volatile but has the serious drawback of leaving a runway surface slippery after the ice has dissolved. One form of alcohol, methanol, is highly toxic and should never be used for ice control.

Pelletized Urea Best

Urea, an ammonia compound, has what some users consider a restrictive operating range—it breaks down into a gell-like mass at temperatures below 15°F. Complaints have also been registered that urea may take hours to react with ice, and that even at best it is not very effective in removing ice.

Nevertheless, the report concluded that pelletized urea, used properly as an anti-icing agent, is the best all-around chemical weapon for airport ice control. The temperature limitation is not considered a serious problem within most of the United States, where the formation of ice and compacted snow usually occurs at temperatures well above 15°F. (It is good practice to sweep the runways promptly after the snowfall has ended).

The speed with which urea will attack ice depends in large part upon the type of coating on the pellets, which is applied to prevent caking, and users of this material should be aware that some coats will slow down the anti-icing activity considerably, while others will permit an immediate reaction.

Urea is about six times as effective as an *anti-icer* compared to its use for de-icing, confirming that the use of chemicals for de-icing is not economically justified. Anti-icing offers little interference with airport operations except during the brief time required to spread the chemical, whereas de-icing may require an airport to be closed for many hours during a storm because of insufficient runway traction.

The key to successful chemical application, according to this report, is the careful monitoring of weather conditions so that anti-icers may be applied just prior to precipitation that could lead to icing, and removed promptly by sweeping after their job is done. When spread on a dry runway too soon, chemicals tend to be blown away by engine blast; and when left in place too long they may create hazards on the runway.

The report, "An Analysis of Airport Snow Removal and Ice Control," is available from the National Technical Information Services, Springfield, Va. 22151. The price is $3.00 and the identification number is AD 728 594.

HUGHIE and CLYDE

For a professional barnstormer, aerial acrobat and derring-do stuntman, Clyde Pangborn chose an odd moment for his most spectacular exploit. The aircraft was at 17,000 feet over the Bering Sea, with nothing below in the form of an audience except an occasional seal basking on an iceberg. The "stunt" involved climbing out on the wing-strut of a high-wing monoplane while it was being buffeted by a severe storm, and hanging down to unscrew and remove two wheel rods. The problem was to complete the task before his fingers and his feet, which were shoeless, froze.

The circumstances which led up to his shoeless predicament over the Bering Sea were many and varied. Clyde Pangborn was one of that small army of footloose pilots who grew up with aviation (he was nine when the Wright brothers flew) and who pursued an elusive dream of fame and fortune in the skies.

Descendant of farming pioneers who had moved westward in covered wagons before the Civil War, Clyde let go of the plow handle the moment he saw his first airplane in 1913, and never returned to the land. After several years of shadowing pilots and begging rides in planes, he learned to fly as a cadet in the Army Signal Corps in 1917, and joined the barnstorming circuit when World War I ended.

Always something of a daredevil, Pangborn had a notorious reputation even before he starred in Gates Flying Circus (as a flying cadet he had bent a few flagpoles while stirring up dust at Kelly Field). Clyde was game for any kind of adventure, and the rich cash prizes frequently offered by newspapers in the twenties for record flights tempted him sorely, but always he lacked the necessary capital and backing for a properly equipped plane.

His big opportunity came in 1927 when he met Hugh Herndon Jr., a young amateur pilot whose well-to-do New York family was willing to back a round-the-world record try. A formal business partnership was formed eventually, and Herndon was sent to study navigation while Pangborn arranged for a suitable airplane to be built.

The aircraft chosen was a Bellanca *Pacemaker*, the high-wing, closed-cabin monoplane design which was enjoying great success in endurance flights. A 425 hp Pratt and Whitney *Wasp* engine was selected to power the airplane, which measured 27 feet 10 inches overall, with a wing span of 46 feet 4 inches. The airplane cruised at about 115 mph.

Unfortunately for Pangborn's ambitions, his partner was less eager for fame than for romance; Hugh Herndon dallied to court and win a bride. The months slipped away from them, and before they could ready their airplane for departure Post and Gatty sped around the world in a record-shattering 8 days, 10 hours and 51 minutes.

Nevertheless, Pangborn and Herndon set off, on July 28, 1931, in an effort to better this record. Their aircraft, bearing the name *Miss Veedol* by arrangement with a sponsor, was much slower than Post's, but Pangborn hoped to compensate for speed by superior navigation. His confidence in Herndon as navigator was given a rude blow on their first hop, intended to be from New York to Moscow nonstop (a new distance record). After hours of wandering about in a storm over the Atlantic they landed in Wales.

They pushed on to Moscow and across Siberia, encountering bad weather most of the way, losing time and eventually all chance of besting Post and Gatty's record.

But as the two men lingered disconsolately in Khaborovsk pending repairs and a break in the weather, opportunity knocked again, this time in the form of an offer from the Japanese newspaper *Asahi* — 50,000 yen (about $25,000) for the first nonstop flight from Japan to the United States mainland. The pot was later sweetened by an offer of $28,000 from the City of Seattle for the

first nonstop flight between Tokyo and Seattle.

Pangborn and Herndon, who had already sunk $50,000 in their round-the world venture, jumped at the chance to recoup their investment. In fact, they zoomed into Japan so fast they did not bother about proper entry papers, which prompted Japanese officials in Toyko to clap them in jail on suspicion of espionage. An agonizing wait of six weeks followed, during which period seven attempts to claim the *Asahi* prize money were made by American aviators—all ending in failure. Finally Pangborn and Herndon were bailed out of prison by Herndon's family, and the weary pair were given permission to depart in *Miss Veedol.*

Because of the heavy load in the airplane (about 9,000 lbs.) they were obliged to use an airstrip at Samushiro Beach, 280 miles north of Tokyo. All expendable items, including a radio and life raft, were discarded in favor of food and fuel. Even with a maximum load of 900 gallons of gasoline Pangborn doubted whether the airplane could reach the coast of Washington, over 4,000 miles away. He reassured worried Japanese officials, however, while he and Herndon constructed a secret weapon: a cable release for dropping the main landing gear after takeoff. He estimated this would add 15 percent to airspeed and range.

All went well on the departure at 7 a.m. on October 4, and the wheels and axle went spinning down into Atsukeshi Bay on schedule. However, when Pangborn looked over the side and saw two bracing rods still protruding from the fuselage, he realized that they could be rammed into the airplane, at great risk to life and limb, on any attempted belly landing ashore. They would have to be removed.

Pangborn decided to put off the problem of removing the wheel rods until they reached cruise altitude, hoping the air would be steadier. But storm clouds followed them up to 18,000 and even 19,000 feet, and finally, as the temperature dropped well below freezing inside the cabin and the light began to fail, he eased himself out onto the monoplane's starboard wing strut, wrapped his legs around it and reached down to unscrew the wheel rod.

At this point, he realized the folly of his having adopted the Japanese custom of flying without shoes. His feet quickly became numb, as did his hands and face, as he wrestled with the stubborn rod while dangling three miles in the sky over the Bering Strait, roaring at Herndon to hold the bucking plane steady. By the time he had released the rod he was frozen almost too stiff to move, but he managed to crawl back into the cabin, thaw out briefly, and repeat the performance on the other side.

They passed over the Aleutians in darkness, the sound of the engine deafening them to the point that conversation was impossible —they communicated with notes. With the first light of day they peered through a break in the clouds below and caught a glimpse of what appeared to be Dutch Harbor. They were dead on course.

At 17,000 feet (well over the normal ceiling of *Miss Veedol* loaded as she was), ice was forming on the wings, slowing them down considerably. Still, they dared not risk plunging down into the turbulent cloud-buildups below. They huddled close together, trying to keep warm in the freezing cabin, and wiggled their numb toes. The engine never missed a beat and *Miss Veedol* chugged steadily on across the gulf of Alaska.

They had about 3,000 miles behind them when the engine sputtered a few times, then stopped dead. Panic reigned for a few moments, and the plane descended to an altitude of 1,000 feet before they remembered to switch fuel tanks, and the windmilling prop restarted the engine.

At 5 p.m. Sunday afternoon they sighted the shores of Queen Charlotte Sound—they were home free, almost. But by the time they reached cloud-covered Seattle, it was 3 a.m. and too dark to land. They circled Mt. Ranier three times, debating a course of action, and decided to press on farther east, perhaps to Salt Lake City, which would give them the long distance record.

In the continuing darkness and poor visibility, the prospect of a belly landing on some remote mountain side dimmed their interest in Salt Lake City as a destination. They turned back, and as dawn was breaking, Clyde Pangborn headed for Wenatchee, Wash., his home town, where a small crowd had gathered at the airstrip.

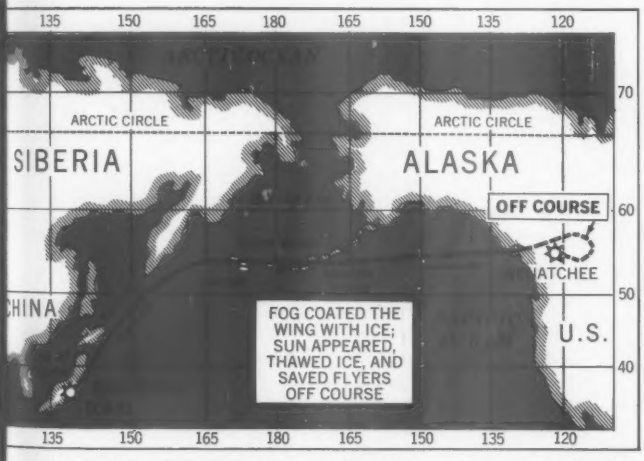
Clyde came in over the familiar strip low and slow, and managed to stop the prop in the horizontal position, but a last minute gust of wind spun it around and *Miss Veedol* came to an ungraceful halt with her tail in the sky. Out of the cabin climbed two deafened, frost-bitten, shoeless aviators, grinning and unhurt. They had spanned the Pacific, 4,600 nonstop miles in 41 hours and 13 minutes.

Pangborn's mother and brother, Percy, managed to push their way through the crowd and greet him, along with a prescient gentleman from Japan with a check for $25,000. Just 100 miles away in Seattle the city fathers pocketed their prize money, on the grounds that the flight had not terminated at their city. Nevertheless, the people of Seattle went wild over young Hughie and Clyde. A school holiday was declared on their belated arrival, children threw flowers at their feet, and young ladies blew kisses from balcony windows. Applause resounded across the nation and the world; even the normally reticent Lindbergh sent a telegram of congratulations from Shanghai.

After taking their bows, the two flyers parted company, as Pangborn continued his pursuit of long distance records, but with dwindling success. It seemed as though he had received his full measure of good fortune during those hazardous hours over the Bering Sea. He spent several years in Europe as a test pilot, and married a Frenchwoman, but the marriage did not last. He and Herndon crossed paths once more, during World War II, when both were ferry pilots. Herndon eventually joined TWA and represented the airline in Cairo until his death in 1953.

Pangborn continued to fly for a living until his health failed. He was stricken with pneumonia while flying to a benefit in New Jersey given by his friends, and died on March 29, 1958. Monuments on the beach at Samushiro, and at the airfield in Wenatchee (Pangborn Field) remain to remind the world of the daring young men who had joined the East and the West.

Ironically enough, their intrepid airplane, *Miss Veedol*, found a watery grave at the bottom of the Atlantic while being flown to Rome by her new owner. Her luck had finally run out.



Photos on opposite page show Hugh Herndon, Jr. (left) and Clyde Pangborn with their Bellanca after a belly-landing terminated their 4,600 mile flight from Japan to the U.S. Route of flight is shown on map at left. Scuttling the landing gear by hand after takeoff gave them 15 percent more speed and range.

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Personal Inspections

The Carefree Cockpit

Fourth in a series of "Sunday inspections" recommended for the small aircraft owner. These are designed to bridge the gap between the pre-flight walkaround and the mandatory "annual"—to identify trouble spots and have them corrected before they grow into problems, incidents or accidents.

Be it ever so humble, spacewise, there is no place like an airplane interior to accumulate junk.

Rain on this particular Sunday predicated an inside job: clean out the cabin! To me this chore had about as much aeronautical appeal as licking a used airmail stamp, but my tolerance of cabin trash accumulation had been given a severe shake-up during a recent landing in a crosswind. Flight conditions for my little single-engine were probably marginal at the time I came on final, but when a loose flashlight rolled under a rudder pedal (the upwind pedal at that!) I nearly put my foot through the floorboards trying to keep from landing on the runway lights.

The incident brought to mind similar stories—like the time my old instructor had a flight computer slide underneath his gear retraction handle, blowing a fuse and rendering the electric gear inoperative. Or the hair-raising tale of the Alaskan bush pilot who survived a crash landing in a swamp unharmed, but almost lost his head when an ax hurtled forward from its backseat repose to imbed itself in the instrument panel.

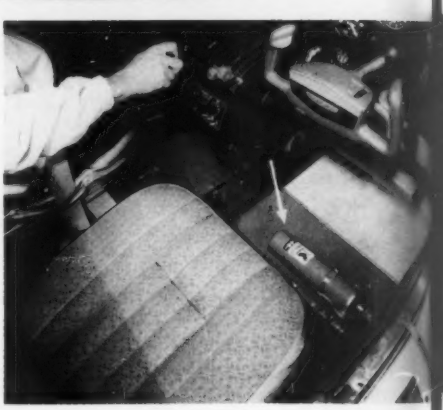
These things always happened to someone else until one fine day—well, I decided it was time to spend a few minutes tidying up.

Several hours later, long after the rain had stopped, I was still sitting in the cabin sifting papers and making lists of missing objects. Outside, three overstuffed litter bags were awaiting disposal. My discards had included nearly a dozen outdated sectional charts, NOTAMs, and newspapers; motel bills, gas bills and unopened mail (also bills); rags, rope ends, and a hopelessly torn raincoat; a half-dead flashlight interred with some quite-dead batteries; some old film cartons, candy and chewing gum wrappers and various fossilized remains of inflight snacks.

On the plus side were all the pencils and ballpoint pens I had lost during the past year. I used one of them to note down needed missing items, beginning with a current chart —my latest one coincided with the first landing on the moon.

A bad moment ensued when I could not locate any of the documents required to be in the plane—airworthiness certificate, registration certificate, and operating limitations (they were finally located *under* some loose floor carpeting). The experience left me less inclined to snicker at pilot friends with a passion for orderliness, who have a place for everything and actually keep everything in its place.

My relentless pursuit of trash concluded with my emptying out the glove and baggage compartments, which yielded among other souvenirs a single torn glove, two unmatched overshoes, and a first-aid kit—barren except for some hardened toothpaste. Some survival kit! Great, for a one-armed, odd-footed dental devotee. *Where are the waterproof matches, the bush knife, the pocket compass, plastic ground sheet, wool sweater and cap I "always kept stowed away in a handy place"?*



My replacement list was almost as long as the discard list. But once I had the cabin area cleaned up and accounted for, I was at last able to slide the seats back and forth on their track and make certain that the backstops held, and the pins locked the seats securely in position, which they did—after an Indian head nickel was retrieved from the track. I also checked the seat belts to see whether the attachment points were secure, and whether the release worked properly. Then I relaxed in the seat and looked around for some real maintenance problems.

The first thing I noticed was that much of the grime obscuring my windshield (for which I had silently abused the line boy) was on the *inside* of the airplane, so I fell to with a soft, clean rag and plastic window cleaner, mindful of how much more vulnerable plastic windows are to scratching than glass is. The label on my can warned me of the irreparable harm that could be caused by using ordinary window cleaning spray, not to mention gasoline, alcohol, benzene, acetone, etc. (all of which tend to dissolve some plastics).

Actually, I could have gotten by with just mild soap and water, as long as there was no grit on the cloth to dig into the soft plastic. One interesting habit of plastic windows, if you try to dust them off with a dry cloth, is their tendency to build up an electrostatic charge—which of course attracts more dust. A scratchy, dusty windshield seems to magnify sun glare.

While in this area I asked a mechanic to have a look at my magnetic compass, since it appeared to me that the fluid level had been dropping of late. He confirmed my suspicions: the instrument should go into the shop. It seems that the compass bowl is filled with a damping agent, usually a low-volatile petroleum liquid, which prevents the compass from spinning wildly during flight maneuvers. The bowl should be

completely filled at all times; any time you can see an airspace in it, help is needed.

My mechanic also imparted a maintenance tip concerning the instrument panel, which is mounted on semi-rigid supports so as to minimize landing shock. You should be able to jiggle the entire panel slightly on most aircraft; if not, the desired play may be jammed by foreign objects or other problems.

I also checked the panel over for dirty or cracked instrument windows, dead light bulbs and worn switches. I turned the radio receiver knobs to see whether the caps clicked positively into place—worn cogs may account for errant reception. And I went over my supply of spare fuses, which had shrunk amazingly. I made sure the microphone jack was free of corrosion and seated firmly, and I actually took the time to untangle the cord.

Doors were next to come under scrutiny. I had been locked *inside* the aircraft several times, as well as locked out, and the thought of requiring the services of a locksmith to release me from burning wreckage troubled my mind more than any chance of being locked out. Judicious use of some graphite seemed to improve the lock action.

Shipshape. Clamped down, fire extinguisher stays where you want it. Airplane papers are accessible but out of the way. Unobstructed seat belts adjust easily and fasten securely.

Looking down at my clean, freshly vacuumed floor, I noticed for the first time that the fuel valve selector, which I had come to operate strictly by feel, had in fact lost its visual identification—the "left," "right," and "both" markings were too badly worn to be read, espceially in a panicky IFR situation. Item: new marking plates.

As I was getting out of the cabin, intent on checking the weather for a possible hop into the rapidly clearing skies, another pilot tapped me on the shoulder and made me an offer for the plane. He smiled knowingly when I assured him I had no intention of parting with it, just wanted to spruce things up a bit. He followed me to the operations shack and made two better offers en route, then gave up, muttering something about, "Make up your mind."

My mind *was* made up: a clean bird is a happy bird. ■

Pilot BRIEFS

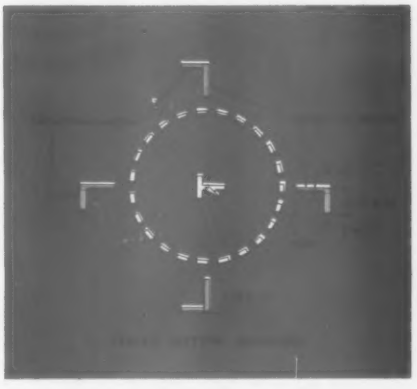
■ MULTI-ENGINE TEST GUIDE. A revised edition of FAA's flight test guide for the multi-engine airplane class or type rating has just been published. The guide explains the procedures and maneuvers required by FAR Part 61 for a pilot flight test in multi-engine aircraft, and will be helpful both to applicants for the rating and instructors. Order AC 61-4C from the Superintendent of Documents, Washington, D. C. 20402. The price is 25 cents; catalog number TD 4.408:M 91.

■ AIRPORT LIGHTING EQUIPMENT. FAA-approved airport lighting equipment and the manufacturers qualified to supply these products are listed in a new advisory circular, AC 150/5345-1C. Copies are available to airport management.

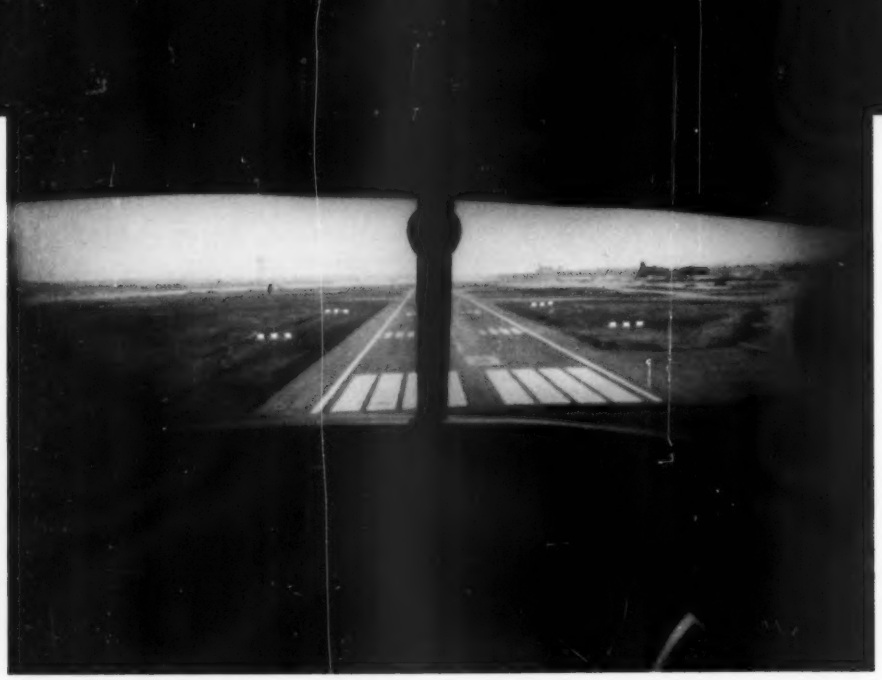
■ ALTIMETER SETTING. Revised guidelines for setting up altimeter setting sources are contained in a new FAA advisory circular, "Altimeter Setting Sources." AC 91-14B cancels the previous AC on this subject (91-14A).

■ AIRCRAFT REGISTRATION DEADLINE ADVANCED. Deadline for submitting FAA aircraft registration forms has been moved up from July 1, 1972 to April 1. AC Form 8050-73, "Aircraft Registration Eligibility, Identification, and Activity Report," is sent out to all aircraft owners by FAA Aircraft Registry in Oklahoma City. Contact the nearest FAA field office if your form has not arrived by March 1.

■ SEGMENTED CIRCLES are discussed in detail in a revised FAA Advisory Circular, AC 150/5340-5A. Use of the entire segmented circle is encouraged; where a right-hand pattern exists this should be indicated by "L" shaped markers, in pairs for each affected runway. Use of an amber flashing light to signal right-hand turns is no longer required. At a field used for night operations the right-turn markers should be illuminated along with the wind sock to advise pilots not only of wind direction but also of a non-standard (right-hand) pattern. Segmented circles should be at least 100 feet in diameter with individual segments six to twelve feet long.



For copies of any of the free advisory circulars listed above, write to DOT Distribution Unit, TAD-484.3, Washington, D.C. 20591.



HIGH PRIORITY is being given by FAA to adding low-cost VASI (Visual Approach Slope Indicator) lights at general aviation airports in conjunction with the Airport Development Aid Program. The VASI provides visual descent guidance. The standard array for medium and large airports consists of a 4 to 12 box arrangement of red and white lights, but a less expensive two-box system (VASI II) is now being approved. Nearly 100 VASI's are now in use.

Fourth Aviation Planning Conference Scheduled for May

Making the best use of our airspace, choice of collision avoidance systems, and concern for environmental factors are some of the topics scheduled for discussion at FAA's Fourth Annual National Aviation System Planning Review Conference to be held May 1-3 in Washington, D.C.

Other subjects to be aired are government/state/municipal roles in ADAP (Airport Development Assistance Program); human factors and biomedical factors in aviation; balanced transportation and new technology.

Those planning to attend the conference should send name, address, company, and area of interest to FAA, HQ-200, 800 Independence Ave., S.W., Washington, D.C. 20591. A $5.00 registration fee is required for each person who wishes to receive all documents, agenda, papers presented, and copies of the 1972 National Airspace System Policy Summary and the Ten Year Plan. Checks made payable to FAA should accompany the registration request.

Van Nuys is No. 1 in General Aviation

Although ranked third in the total number of aircraft operations, Van Nuys Airport in California is still the busiest general aviation airport in the United States with 558,812 aircraft operations in the latest count.

Chicago O'Hare continues to hold the number one spot with 628,013 operations, followed by Long Beach with 565,102. Los Angeles International has dropped to 5th and JFK has risen to 11th.

A complete report entitled "FAA Air Traffic Activity—Fiscal Year 1971" is available from the Superintendent of Documents, U.S. Government Printing Office, Washington, D.C. 20402. Price is $2.00 and Stock Number is 5007-0169.

Extra Wind Socks Recommended Upwind of Runway Threshold

Guidelines for locating supplemental wind cones (wind socks) near the approach ends of runways, where standard airport equipment does not furnish adequate wind information to pilots on landing and takeoff, are offered in a new FAA Advisory Circular AC 150/5340-23. Extra wind socks are recommended where the distance from the runway end to the principal airport wind indicator is excessive (in some cases two or three miles) or where there is a history of abnormal wind movement.

Suggested location for supplemental wind cones is 150 feet from the runway edge, preferably on the left, 800 feet upwind of the runway threshold. This position would supply continuous and immediately current data to pilots taking off and landing, where it is most needed.

To meet FAA standards, supplemental wind cones must comply with certain requirements of construction. Runway obstruction and ILS criteria must be considered in locating the indicator, and a notice of proposed construction must be provided FAA under FAR Part 77.13 (a)(5).

Copies of AC 150/5340-23 may be obtained from DOT/FAA Distribution Unit, TAD-484.3, Washington, D.C. 20591.

Flight Instructor Refresher Courses

Calendar Year 1972
February 15 through June 1

2/15-17	AOPA & Nev. Safety Council Las Vegas, Nevada	FII	4/11-13	Ga. Dept. of Ind. & Trade Atlanta, Georgia	FIA
2/15-17	Arkansas Aero Commission Little Rock, Arkansas	FII	4/11-13	Wisc. DOT, Div. of Aero Wisconsin	FII
2/23-25	Oregon Board of Aeronautics Portland, Oregon	FII	4/18-20	AOPA & Colo. Flt. Inst. Assn., Denver, Colorado	FII
2/29-3/2	Okla. Aero Commission Stillwater, Oklahoma	FIA	4/25-27	Va. Div. of Aeronautics Ft. Monroe, Virginia	FIA
2/29-3/2	AOPA & NAFI Philadelphia, Pa.	FIA	4/25-27	Utah Division of Aero Salt Lake City, Utah	FIA
3/7-9	Montana Aero Commission Great Falls, Montana	FII	5/2-4	Mass. Aero of Commonwealth, Boston, Mass.	FIA
3/14-16	AOPA & Md. Avia. Comm. Baltimore, Maryland	FIA	5/9-11	AOPA & State of Florida Sarasota, Florida	FII
3/14-16	Texas Aero Commission Houston, Texas	FIA	5/16-18	New York State DOT Albany, New York	FII
3/21-23	Idaho Dept. of Aeronautics Boise, Idaho	FIA	5/16-18	AOPA & Calif. Dept. of Aero Sacramento, Calif.	FIA
3/28-30	Conn. Dept. of Aeronautics Windsor Locks, Conn.	FII	5/23-25	Eastern Region, CAP Farmingdale, L.I., N.Y.	FII
3/28-30	AOPA & Mt. San Antonio Jr. College, Walnut, California	FIA	5/23-25	Texas Aero Commission Wichita Falls, Texas	FIA
4/4-6	AOPA & Purdue University Lafayette, Indiana	FIA	5/30-6/1	AOPA & W. Va. Aero Comm. Charleston, West Virginia	FII

SYMBOLS:
FIA=Flight Instructor-Airplanes
AOPA=Aircraft Owners & Pilot Association
FII=Flight Instructor-Instrument
CAP=Civil Air Patrol
NAFI=National Association of Flight Instructors

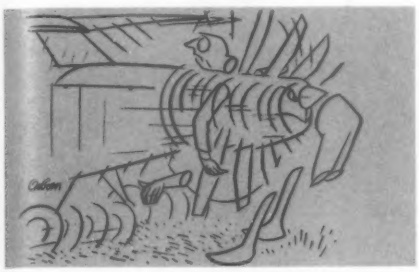
(To enroll, contact the sponsor)

FAA Aviation News welcomes comments from the aviation community. We will reserve this page for an exchange of views. No anonymous letters will be used, but names will be withheld on request.

• Out of Sight

Will you ask your artist Osborn for the telephone number of the widow of the two-left-handed pilot shown being gobbled up by a prop on the back page of your excellent September issue?

Russ Brinkley
Harrisburg, Pa.



Sorry, the widow in question is still in mourning and prefers to remain anonymous.

• When the Weather?

"Weather broadcast twice hourly?" That's what it says on page 11 of the August '71 issue of FAA AVIATION NEWS. Chapter 5, Part 1, Airman's Information Manual talks about a scheduled weather broadcast from certain VOR's at 15 minutes past the hour. Where does one learn about the other broadcast mentioned in the excellent and otherwise enlightening article "Looking with Your Ears"?

I agree that the key element of the ELT's successful operation will be the listening general aviation pilot. Keep up the good work.

R. W. Smith
Westminster, Calif.

You will still hear weather broadcast at 45 minutes past (in fact, every quarter hour) whenever previously unforecast hazardous weather (squall lines, hail, imbedded thunderstorms) causes National Weather Service to issue a SIGMET (significant meteorological information). "Special Weather Observations" (containing such urgent weather information as a sudden lowering of the ceiling from 1,000' to 800') may be broadcast at any time.

The regular second hourly broadcast (at 45 minutes past the hour) was discontinued about two years ago because the work load of the FSS Specialist would not allow it.

• Mix and Match

In answer to a question in the October 1971 Flight Forum regarding water in aircraft fuel, it is my opinion that an additive like "DRY GAS," used in cold weather in auto fuel tanks to prevent engine conk-outs from condensation, will prevent water in plane fuel tanks from stalling the engine in flight. It causes water to mix with gasoline and burn with fuel. I don't think it is against any law to use it, and perhaps some research, FAA approval, and publicity of this type of product would prevent a few engine-out accidents.

Charles P. Ricci
Pompano Beach, Fla.

The type of additive you suggest usually contains alcohol or glycol, which combines with any free water present in the fuel tank, preventing the water from freezing and closing the line. We know of no acceptable fuel additive which causes ***water to mix or blend with gasoline.***

While various anti-icing additives have been offered for use in automobile fuel systems, none have been substantiated for use in the fuel systems of reciprocating engine-powered airplanes. One factor which would have to be considered in this respect would be the additive's compatibility with both airplane and engine—for example, with the various sealants used in the plane's fuel system. Before using any aircraft fuel additive, the airplane manufacturer should be consulted.

No known additive would justify abandoning the preflight precaution of draining fuel tank sumps sufficiently to assure that the tank contains no water that could cause engine stoppage.

• Long-winded Approach

After a recent flight to Danville, Ill., I was returning to Buffalo, N.Y., about 7 p.m. I had been cleared by the tower to land on Runway 31, but my approach took longer than usual because of a strong headwind. A voice on the radio asked, "Is that guy on instruments?"

The tower explained (to an airline pilot who was holding his jet for takeoff on an intersection runway) "No, but I thought he was a little bit closer in. I am holding you up because of the turbulence problem."

The airline pilot replied, "Well, it is pretty windy, and it would probably not make any difference."

I want to compliment this controller on exercising the caution he did. If he had let the big jet go he would have been past Runway 31 just about the time I was rolling out, and I would surely have been caught in severe wake turbulence.

William C. Rausch
Lancaster, N.Y.

• Revealing Slips

Why does FAA send coded results of FAA written exams to the applicants? If a mechanic taking the A & P exam misses a few questions, but passes the test, the coded information is too broad to even allow a guess as to what questions were missed. The mechanic, mistakenly assuming he was right on some point, could later use the information and be wrong. Would it be too revealing to send a copy of the questions missed to only those granted licenses?

Wendell E. Thrasher
Hollywood, Fla.

The A & P test answer sheets are graded by an electronic computer, which prints out the grade and a code of subject areas in which questions were missed.

Even though an A & P applicant passes the test he should review those subjects indicated by the codes on the AC Form 8060-37, and make certain that he knows the correct answers. Revealing the questions missed by applicants could compromise the FAA written test, and consequently the high safety standards of the profession.

• Bird Watching

Do you have any information regarding the colors which are most noticeable for an aircraft in the air?

Harold L. Olsen
Madison, Wis.

Information gathered from a report "The Role of Paint in Midair Collision Prevention," prepared for FAA in 1961, was not considered conclusive enough by FAA to recommend painting aircraft specific colors or patterns. For a copy of the report send check or money order for $6.00 to National Technical Information Service, 5285 Port Royal Road, Springfield, Va. 22151. State name of report and catalog number: AD 273691.

• Transistorized Microphones?

In "The Captain Speaking" in the September 1971 issue of FAA AVIATION NEWS you refer to a transistorized microphone. I maintain a complete reference file on all microphones, but I have never come across a "transistorized microphone." I would appreciate information on this new item which does not appear to have reached the American market.

Also, I believe the author is blaming the mike more than the improper usage of such. The method and angle of expression into a microphone definitely depends on whether it is condensor, dynamic, carbon or crystal. My suggestion is to "learn your equipment before you use it, especially airplanes."

Gil Daney
Anchorage, Alaska

The term "modern transistorized microphone" refers to a microphone which contains a transistorized amplifier. These have been available for some time and are offered by most commercial suppliers of such items.

We agree that proper usage of your equipment is vital; however, numerous cases of poor transmissions have been traced back to faulty equipment of which the user was unaware.

• Airport Traffic Separation

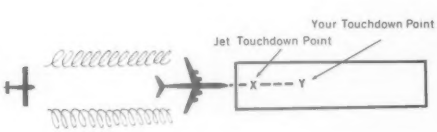
The suggestion from a reader to separate high wing and low wing aircraft, both vertically and laterally, is the best procedure I have heard of for some time. I hope it gets full consideration in development of the final rule.

Duane I. Havens
St. Clair County
Airport Commission
Port Huron, Mich.

• VASI versus Vortex

Would you please answer the following question which I encountered on an FAA written exam? General aviation aircraft have been instructed when landing behind large turbojet aircraft to make their approach at or above the altitude of the jet, and to touch down at or beyond his point of touchdown. When the approach is made to a runway with a VASI (visual approach slope indicator) what is the correct glide slope segment for general aviation aircraft to fly?

T. D. Weldin
Camden, S.C.



It would be both "correct" and safe to approach above *the jet's glide slope (on a white/white VASI indication) insofar as both the hazards of wake turbulence and acceptable VASI indications are concerned. Incidentally, we are not familiar with any vortex avoidance procedure calling for pilots of light aircraft to plan to land* at *the point of touchdown of a preceding heavy jet.*

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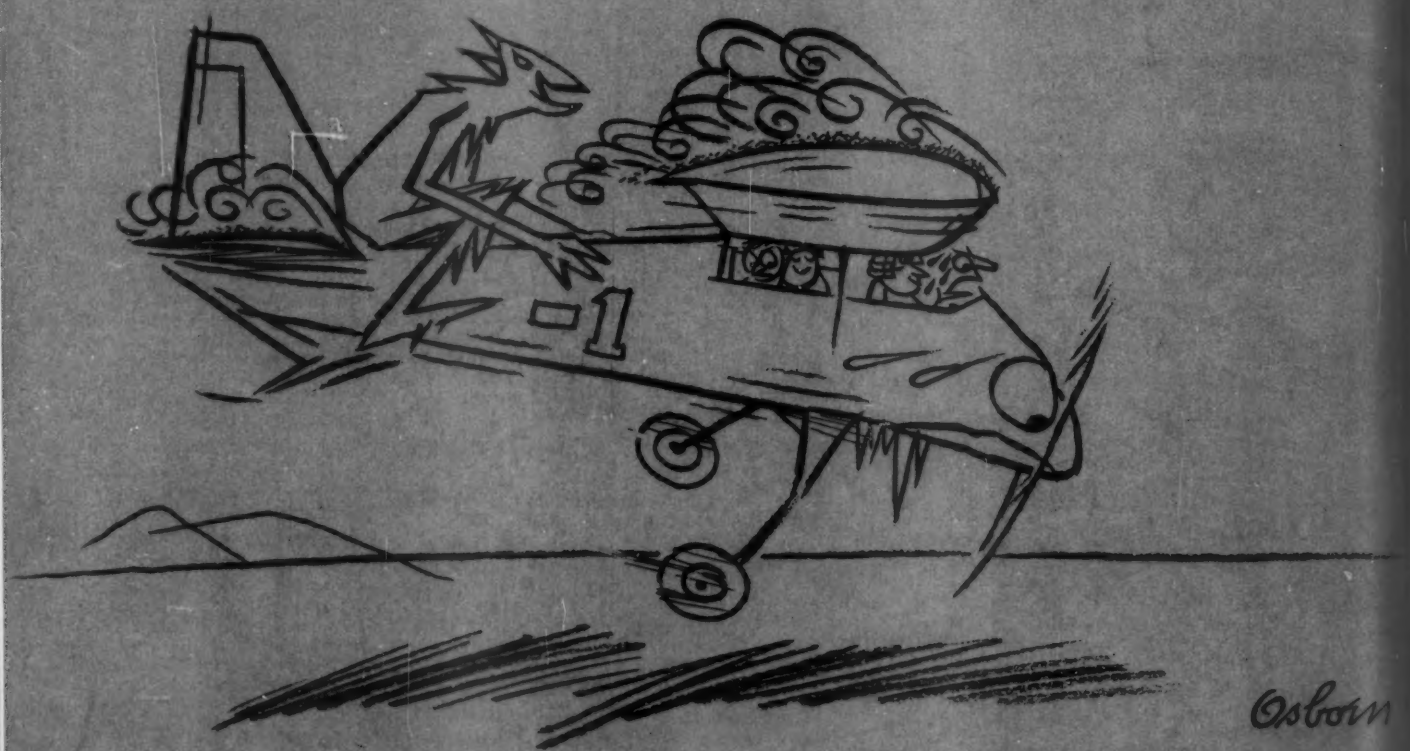

To that old devil frost

Suggested by Jerry W. Forsythe